



## Physico-chemical properties of Lassi sold in Akola market

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**ABSTRACT :** The present investigation was done in the laboratory of Department of Animal Husbandry and Dairying, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the year 2010-2011. In this study organoleptic qualities of lassi viz., colour and appearance, body and texture, flavour, acidity and in chemical qualities included fat, protein, lactose, sucrose, total solids, total sugar, acidity and pH were determined and studied. On the basis of sensory evaluation considering colour and appearance, body and texture, acidity and flavour attributes, the control sample (laboratory made) lassi liked very much by the panel of judges. The lassi samples studied here showed considerable variation in sensory and chemical quality.

**KEY WORDS :** Lassi, Colour and appearance, Body and texture, Flavour

**HOW TO CITE THIS PAPER :** Bhoir, K.R., Gubbawar, S.G., Shelke, R.R., Nage, S.P. and Sakate, S.B. (2012). Physico-chemical properties of Lassi sold in Akola market, *Res. J. Animal Hus. & Dairy Sci.*, **3**(1) : 17-20.

### INTRODUCTION

Lassi is a popular indigenous fermented milk beverage, which is usually prepared by mixing Dahi and water in required proportions. It is served on very large scale in cold drink shops, bars and restaurants during summer in almost every state in India. The fermented milk products are prepared by the action of microorganisms by adding starter culture which modify the substrates biochemically and organoleptically in to edible products and are thus generally palatable, safe and nutritious (Campbell Platt, 1994.)

The process of souring or fermentation of milk is one of the oldest methods known for preserving milk constituents. The fermented milk products have reputation due to their nutritional and therapeutic properties from the time immemorial. Fermented milk products are easily digested because of breaking down of proteins in the peptides and free amino acids. Fermentation of milk converts lactose to lactic acid that can stimulate gastric secretion and speed up the transport of gastric contents into the intestinal tract. This

lactic acid suppresses the growth of putrefactive bacteria which are associated with constipation (Hosono, 2002). Lactic acid bacteria improve the digestibility of milk components, synthesize vitamins and produce beneficial metabolites like antibiotics, anti-carcinogenic compounds etc. during fermentation. By considering the nutritional significance and economical importance of lassi, it becomes essential to find out and check organoleptic qualities of Lassi. Keeping these points in view, it was proposed to carry out research work on evaluation of the physico-chemical properties of Lassi sold in Akola market.

### MATERIALS AND METHODS

#### Collection of Lassi samples:

Preliminary survey was conducted in the local market, to know the brands and to ascertain the availability of Lassi throughout the study period. Polythene pouch packaged Lassi of pre-determined brands were collected from the local market and brought to the laboratory as and when required to complete analysis. The samples were brought in the chilled condition. The samples were stored under refrigerated temperature till its use for analytical purpose.

#### Laboratory made Lassi for control group:

Lassi was prepared from cow milk. Cow whole milk was inoculated with *Lactobacillus* spp. (1%) culture. Set curd (12-

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14hr) broken with agitator was added with 10 per cent water, 8 per cent cane sugar on weight basis of Dahi. This mixture was mixed well with agitator and was considered as laboratory sample (control) for the study. Analysis of Lassi samples was carried out sequentially for organoleptic quality and chemical composition. (De, 1980).

#### Treatment details:

CS- Control sample (laboratory made Lassi), MS<sub>1</sub>-Market Lassi sample-1  
MS<sub>2</sub>-Market Lassi sample-2, MS<sub>3</sub>-Market Lassi sample-3  
MS<sub>4</sub>- Market Lassi sample- 4.

#### Organoleptic quality of Lassi:

The refrigerated ( $7^{\circ} \pm 1^{\circ}\text{C}$ ) stored Lassi samples were subjected to organoleptic evaluation. The panels of six semi-trained judges were provided with the samples of Lassi for sensory evaluation. The organoleptic quality of Lassi samples was evaluated as per '9' point hedonic scale (IS: 6273, part II, 1971) and Nair *et al.* (2007).

#### Chemical analysis of Lassi:

Lassi samples (market and laboratory made) were analyzed as, fat was determined by Gerber method as per described in BIS Handbook of Food Analysis of Dairy Product in SP: 18 (Part XI) 1981. Nitrogen content was determined by micro Kjeldhal method as per the procedure recommended in B.I.S. Handbook of food analysis Dairy Products SP: 18 (Part XI) 1981. The acidity of milk expressed as per cents lactic acid was determined by the method described in IS: 1479 (Part I), 1960. The pH of Lassi samples was determined by using digital pH meter following the procedure stated in IS: 1479 (Part-II, 1961). Lactose was determined as per Lane - Eynon's method given in IS: 1479 (Part-II, 1961). Sugar (sucrose) per cent contained in Lassi samples was worked out by subtracting reducing sugar (lactose) from total sugar of Lassi. Total sugar of Lassi samples was determined as per procedure of Lane and Eynon (1923) and modified by Ranganna (1977). The total solids content was determined by gravimetric method as per IS: 1479 (Part II), 1961.

#### Statistical analysis:

Randomized Block Design (RBD) with six replications were used for analysis of data (Panse and Sukhatme, 1985).

## RESULTS AND DISCUSSION

The experimental findings of the present study have been presented in the following sub heads:

#### Organoleptic evaluation of Lassi:

The organoleptic qualities of market and control samples of Lassi were evaluated for different sensory attributes. Nine point hedonic scale was provided to the panel of six semi trained judges to evaluate the Lassi samples. Each sample was given code number which was changed from trial to trial so as to avoid its identity. The numerical scores given by the judges for individual quality attribute were computed to get means and these means were subjected to statistical analysis. The results for organoleptic quality of Lassi are presented in Table 1 and discussed here after.

#### Colour and appearance:

It is seen from the Table 1 that the average scores obtained for colour and appearance attribute for MS<sub>1</sub>, MS<sub>2</sub>, MS<sub>3</sub>, MS<sub>4</sub> and CS were as 7.50, 7.33, 6.00, 7.00 and 8.33, respectively which differed significantly ( $P < 0.05$ ). According to scores allotted, these samples could be placed as  $CS > MS_1 > MS_2 > MS_4 > MS_3$  in descending order.

#### Body and texture:

The scores on organoleptic evaluation of Lassi in market and laboratory made (control) samples for body and texture attribute are presented in Table 1. Statistically significant ( $P < 0.05$ ) variation was observed in these scores.

On the basis of score allotted to Lassi samples in respect of body and texture, it could be arranged (descending order) as  $CS > MS_2 = MS_4 > MS_1 > MS_3$ .

#### Flavour :

The average scores allotted for flavour of market and control sample of Lassi are presented in Table 1 which showed variation and differed significantly ( $P < 0.05$ ). The maximum score was allotted to the control sample. It was within the range of 7.83 to 6.50 in case of market Lassi. According to score allotment, the samples could be placed as  $CS > MS_4 > MS_1 > MS_2 > MS_3$  in descending order.

#### Acidity :

The average scores allotted for acidity as a sensory

**Table 1 : Score for various organoleptic parameters of Lassi samples as per treatments**

Organoleptic parameters	Mean values of scores obtained for six replications					'F' test	SE (m)±	C.D. (P=0.05)
	CS	MS-1	MS-2	MS-3	MS-4			
Colour and appearance	8.33	7.50	7.33	6.00	7.00	Sig.	0.4966	1.489
Body and texture	8.50	7.66	7.83	7.16	7.83	Sig.	0.2108	0.632
Flavour	7.83	7.33	7.16	6.50	7.50	Sig.	0.2108	0.632
Acidity	8.16	8.16	8.16	7.16	8.16	Sig.	0.251	0.751

attribute of market and control samples of Lassi presented in Table 1 showed variation and differed significantly ( $P < 0.05$ ). The maximum score 8.16 was allotted to the CS, MS<sub>1</sub>, MS<sub>2</sub>, MS<sub>4</sub> of Lassi, while in case of market samples of Lassi it was within the range 8.16 to 7.16. According to score allotted, these samples could be placed as CS= MS<sub>1</sub>= MS<sub>2</sub>= MS<sub>4</sub>> MS<sub>3</sub> in descending order. Some what similar trend was noticed for organoleptic quality *i.e.* colour and appearance, body and texture, flavour, acidity and overall acceptability of Lassi by Nair *et al.* (2007).

**Chemical quality:**

The laboratory made (control) and market sample of lassi were analyzed chemically for its constituents *viz.*, fat, protein, lactose, sucrose, total sugar, total solids, acidity, pH and results are presented in Table 2 and discussed as follows.

**Fat:**

The average values of fat content in the control and market samples of Lassi presented in Table 2 showed significant ( $P < 0.05$ ) variation. The maximum fat (4.73 %) was observed in the control sample of Lassi. Whereas, it was in the range of 3.26 per cent to 2.88 per cent in case of market samples of Lassi. According to fat content, the samples could be placed as CS>MS<sub>4</sub>>MS<sub>2</sub>>MS<sub>1</sub>>MS<sub>3</sub> in descending order. Some what similar observations on fat content of Lassi were recorded by Pagote and Balchandran (1993) in Lassi prepared by direct acidification of milk. Variable results were recorded by Kapase (1998) who prepared Lassi with differed objectives.

**Protein:**

The results on determination of protein content in market and laboratory made Lassi sample are presented in Table 2. Statistically significant ( $P < 0.05$ ) variation was observed in these values. On the basis of protein content in Lassi, the samples could be arranged (higher to lower) as CS> MS<sub>2</sub>> MS<sub>1</sub>> MS<sub>4</sub>> MS<sub>3</sub>. With regards to protein content in Lassi, variable results were recorded by and Pagote and Balchandran

(1993) but, they are within the range of what was observed in our study.

**Lactose:**

The results on determination of lactose content in market and laboratory made Lassi samples recorded in Table 2 showed significant variation indicating that lactose is the milk component which showed least variation in Lassi. The maximum lactose (4.511%) was determined in the control sample of Lassi. It was within the range of 4.183 to 3.755 per cent in case of market samples of Lassi. According to lactose content, these samples could be placed as CS>MS<sub>1</sub>>MS<sub>4</sub>>MS<sub>2</sub>>MS<sub>3</sub> in descending order. Similar observations on lactose content of lassi were recorded by Velve *et al.* (1972), Chaudhari (1959) and Laxminarayana and Shankar (1980).

**Sucrose:**

The mean values for sucrose content in the laboratory and market samples of Lassi furnished in Table 2 showed variation and differed significantly ( $P < 0.05$ ). The minimum sucrose (8.085%) was recorded in the control sample of Lassi, but was significantly high (range of 9.46 to 8.51%) in case of market samples of Lassi. On the basis of sucrose content, Lassi samples can be graded as MS<sub>2</sub>>MS<sub>4</sub>>MS<sub>1</sub>>MS<sub>3</sub>>CS in descending order.

**Total sugar:**

Average values of total sugar content in market and laboratory made Lassi samples were recorded in Table 2. Significant variation was observed in these values. On the basis of total sugar content in Lassi, the samples could be arranged in ascending order as MS<sub>3</sub><CS<MS<sub>2</sub><MS<sub>1</sub><MS<sub>4</sub>.

In respect of total sugar content in Lassi, variable results were recorded by Kapase (1998) but they are within the range of what was observed in present study.

**Total solids:**

The mean values pertaining to total solids content in the

**Table 2 : Chemical analysis of various lassi samples as per treatments**

Chemical parameters	Mean values of scores obtained for six replications					'F' test	S.E.(m)±	C.D. (P=0.05)
	CS	MS-1	MS-2	MS-3	MS-4			
Fat (%)	4.73	2.98	3.11	2.88	3.26	Sig.	0.0484	0.145
Protein (%)	3.48	3.42	3.47	3.35	3.41	Sig.	0.0204	0.061
Lactose (%)	4.51	4.18	3.99	3.76	4.06	Sig.	0.0253	0.076
Sucrose (%)	8.09	9.28	9.46	8.51	9.44	Sig.	0.0169	0.050
Total sugar (%)	12.6	13.5	13.3	12.3	13.5	Sig.	0.0302	0.090
Total solids (%)	21.6	20.4	20.6	19.0	20.9	Sig.	0.0524	0.157
Acidity (%)	0.99	0.74	0.96	0.60	0.97	Sig.	0.0068	0.020
pH	4.20	4.37	4.22	4.26	4.18	Sig.	0.0051	0.015

Sig. = significant

laboratory made (control) and market samples of Lassi are recorded in Table 2, which showed significant variation. The highest (21.626%) total solids content was observed in the laboratory made Lassi samples, while in it was in the range of 20.840 to 19.031 per cent in case of branded Lassi samples. According to total solids content, the Lassi sample studied here could be arranged in descending order as CS>MS<sub>4</sub>>MS<sub>2</sub>>MS<sub>1</sub>>MS<sub>3</sub>. With regards to total solids content in Lassi, the results of present study are in agreement with those reported by Pagote and Balchandran (1993), Jadhav (1991) and Kalokhe (1991).

#### Acidity:

The average values of acidity of the control and market samples of Lassi presented in Table 2 showed significant variation. The acidity of the Lassi samples was in the range of 0.60 per cent to 0.99 per cent (lactic acid). Some what similar observations on acidity of Lassi were recorded by De (1980), Jadhav (1991), Rathaur and Solankey (2002).

#### pH:

The significant variation was noted in case of pH (Table 2) as like that of acidity. The pH of the lassi samples was in the range of 4.180 to 4.437 and the Lassi samples were arranged in descending order as MS<sub>1</sub>>MS<sub>3</sub>>MS<sub>2</sub>>CS>MS<sub>4</sub>.

#### Conclusion:

On the basis of sensory evaluation considering colour and appearance, body and texture, acidity and flavour attributes, the control sample (laboratory made) Lassi was liked very much by the panel of judges. The Lassi samples studied here showed considerable variation in sensory and chemical quality. However, control sample of Lassi was found to be better than that of market samples.

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**Received : 12.01.2012; Revised: 25.03.2012; Accepted : 21.05.2012**